

FQ5-624

22

Claims:

1. A data transfer system for transferring control information from a control terminal to a target through a data transmission network including at least one data transmission equipment working in a predetermined communication protocol, wherein

each of said at least one data transmission equipment comprises:

a receiving section for receiving a transmission signal including control information from upstream;

a transmitting section for transmitting a transmission signal including control information to downstream; and

a forwarding section for forwarding control information included in a received transmission signal to the transmitting section without controlling the control information according to the predetermined communication protocol.

2. The data transfer system according to claim 1, wherein the forwarding section comprises:

a data extractor for extracting the control information from the received transmission signal; and

a data inserter for inserting the extracted control

FQ5-624

23

information into a predetermined one of a first location and a second location of the transmission signal to be transmitted.

3. The data transfer system according to claim 2,
wherein the first location is data communication channel (DCC)
5 bytes of the transmission signal and the second location is
DCC transmit bytes that are previously determined in the
transmission signal.

4. The data transfer system according to claim 3,
wherein
10 the data extractor extracts the control information
from the first location of the received transmission signal;
and

the data inserter inserts the extracted control
information into the second location.

15 5. The data transfer system according to claim 3,
wherein
the data extractor extracts the control information
from the second location of the received transmission signal;
and

20 the data inserter inserts the extracted control
information into the second location.

6. The data transfer system according to claim 3,

EQ5-624

24

wherein

the data extractor extracts the control information from the second location of the received transmission signal; and

5 the data inserter inserts the extracted control information into the first location.

7. The data transfer system according to claim 1, wherein the forwarding section further comprises:

a data extractor for extracting the control
10 information from the received transmission signal;

a first data inserter for inserting the extracted control information into a first location of the transmission signal to be transmitted;

a second data inserter for inserting the extracted
15 control information into a second location of the transmission signal to be transmitted; and

a switch for forwarding the extracted control information to a selected one of the first and second data inserters depending on predetermined control information.

20 8. The data transfer system according to claim 4, wherein an upstream data transmission equipment works in a different communication protocol and a downstream data transmission equipment works in the predetermined communication protocol.

FQ5-624

25

9. The data transfer system according to claim 5, wherein both an upstream data transmission equipment and a downstream data transmission equipment work in the predetermined communication protocol.

5 10. The data transfer system according to claim 6, wherein an upstream data transmission equipment works in the predetermined communication protocol and a downstream data transmission equipment works in a different communication protocol.

10 11. The data transfer system according to claim 1, wherein the data transmission network is composed of data transmission equipments working in the predetermined communication protocol.

12. The data transfer system according to claim 3,
15 wherein bytes that are not used in the transmission signal are assigned to the DCC transmit bytes.

13. A data transmission apparatus in a data transfer system for transferring control information from a control terminal to a target through a data transmission network, wherein
20 the data transmission apparatus works in a predetermined communication protocol, comprising:

FQ5-624

26

a receiving section for receiving a transmission signal including control information from upstream;

a transmitting section for transmitting a transmission signal including control information to

5 downstream; and

a forwarding section for forwarding control information included in a received transmission signal to the transmitting section without controlling the control information according to the predetermined communication
10 protocol.

14. The data transmission apparatus according to claim 13, wherein the forwarding section comprises:

a data extractor for extracting the control information from the received transmission signal; and

15 a data inserter for inserting the extracted control information into a predetermined one of a first location and a second location of the transmission signal to be transmitted.

15. The data transmission apparatus according to claim 14, wherein the first location is data communication channel
20 (DCC) bytes of the transmission signal and the second location is DCC transmit bytes that are previously determined in the transmission signal.

16. The data transmission apparatus according to claim

FQ5-624

27

15, wherein

the data extractor extracts the control information
from the first location of the received transmission signal;
and

5 the data inserter inserts the extracted control
information into the second location.

17. The data transmission apparatus according to claim
15, wherein

the data extractor extracts the control information
10 from the second location of the received transmission signal;
and

the data inserter inserts the extracted control
information into the second location.

15 18. The data transmission apparatus according to claim
15, wherein

the data extractor extracts the control information
from the second location of the received transmission signal;
and

20 the data inserter inserts the extracted control
information into the first location.

19. The data transmission apparatus according to claim
13, wherein the forwarding section further comprises:

a data extractor for extracting the control

EQ5-624

28

information from the received transmission signal;

a first data inserter for inserting the extracted control information into a first location of the transmission signal to be transmitted;

5 a second data inserter for inserting the extracted control information into a second location of the transmission signal to be transmitted; and

a switch for forwarding the extracted control information to a selected one of the first and second data
10 inserters depending on predetermined control information.

20. A data transfer method for transferring control information from a control terminal to a target through a data transmission network including at least one data transmission equipment working in a predetermined communication protocol,
15 comprising:

at each of said at least one data transmission equipment,

a) receiving a transmission signal including control information at a receiving section from upstream;

20 b) forwarding control information included in a received transmission signal to a transmitting section without controlling the control information according to the predetermined communication protocol; and

c) transmitting a transmission signal including the
25 control information from the transmitting section to

FQ5-624

29

downstream.

21. The data transfer method according to claim 20,
wherein the step b) comprises:

b.1) extracting the control information from the
5 received transmission signal; and

b.2) inserting the extracted control information
into a predetermined one of a first location and a second location
of the transmission signal to be transmitted.

22. The data transfer method according to claim 21,
10 wherein the first location is data communication channel (DCC)
bytes of the transmission signal and the second location is
DCC transmit bytes that are previously determined in the
transmission signal.

23. The data transfer method according to claim 22,
15 wherein

in the step b.1), the control information is
extracted from the first location of the received transmission
signal; and

in the step b.2), the extracted control information
20 is inserted into the second location.

24. The data transfer method according to claim 22,
wherein

EQ5-624

30

in the step b.1), the control information is
extracted from the second location of the received transmission
signal; and

in the step b.2), the extracted control information
5 is inserted into the second location.

25. The data transfer method according to claim 22,
wherein

in the step b.1), the control information is
10 extracted from the second location of the received transmission
signal; and

in the step b.2), the extracted control information
is inserted into the first location.

26. The data transfer method according to claim 22,
15 wherein bytes that are not used in the transmission signal are
assigned to the DCC transmit bytes. .

27. A program instructing a computer of a data
transmission equipment to forward control information, wherein
the data transmission equipment works in a predetermined
20 communication protocol, comprising the steps of:

- a) receiving a transmission signal including
control information at a receiving section from upstream;
- b) forwarding control information included in a
received transmission signal to a transmitting section without

EQ5-624

31

controlling the control information according to the
predetermined communication protocol; and

c) transmitting a transmission signal including the
control information from the transmitting section to

5 downstream.

28. The program according to claim 27, wherein the step
b) comprises:

b.1) extracting the control information from the
received transmission signal; and

10 b.2) inserting the extracted control information
into a predetermined one of a first location and a second location
of the transmission signal to be transmitted.

29. The program according to claim 28, wherein the first
location is data communication channel (DCC) bytes of the
15 transmission signal and the second location is DCC transmit
bytes that are previously determined in the transmission signal.